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NOTES ON CHRYSOPA OCULATA SAY AND ITS RELATION TO THE ORIENTAL PEACH MOTH (*LASPEYRESIA MOLESTA* BUSCK.) INFESTATION IN 1930.

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INTRODUCTION

While making peach twig collections for parasite recoveries during the first part of June, a few Chrysopid adults were observed throughout the orchards. No particular attention was paid to this insect until late in July, when adults could be found on almost every tree throughout the orchards of the Niagara district. Several specimens were sent to Ottawa for determination and it was found that two species were represented, viz., *Chrysopa oculata* Say. and *Chrysopa albicornis* Fitch., the former being by far the more numerous. Eggs began to appear the latter part of July and could be located in numbers varying from one to four on almost every tree.

We have no previous records of this predaceous insect appearing in such great numbers in the peach orchards of the Niagara district. The cause for such an outbreak this year, although not definitely established, may be explained by the fact that the number of aphids, their usual host, was very limited—apparently due to the very dry weather which prevailed throughout the season. The Chrysopids adjusted themselves to the situation by adopting other sources of food and the Oriental Peach Moth, both in egg and larval stages, seems to have been its favourite host.

Several Peach Moth egg counts which were made at various points in the peach growing district have shown that from 20 to 60 per cent of the eggs were sucked by the chrysopid larvae. The eggs that are sucked are very easy to differentiate from those that are normally hatched by the fact that their shells are flattened down to the surface of the leaves on which they are located and one or two small holes made by the sucking jaws of the chrysopid larvae may be seen at the base of the egg shells.

LIFE-HISTORY AND BIOLOGY

Egg Stage—

The eggs of the chrysopids, which are very easy to distinguish from the eggs of other insects by their gelatinous stalks on which they are normally attached, are elliptical in shape and green in colour. Although they may be deposited in many different ways, the ones observed on peach trees during the summer were generally scattered, that is, only one egg per leaf, and deposited on the under surface of the leaves. On very rare occasions numbers varying between two and five were observed on the same leaf. In such cases they were never closer than eight millimeters to each other, apparently so arranged that the hatching larva cannot migrate on the stalked egg next to it and destroy it. Un-

der natural conditions they hatch in from 4 to 11 days. This is in accordance with a few experiments carried on during the season with eggs that were laid by females in captivity.

An attempt was made to find out the total number of eggs per tree laid by the Chrysopids and the results of several counts have shown numbers varying from 1 to 25. The peak of egg laying was during the first part of August, and at that time numbers of eggs varying from 3 to 8 were found for every hundred of peach moth eggs. No eggs could be found in the orchard after the last of September, although it is very possible that some were available at that time.

Larval Stage—

It is not necessary to give in this paper a description of the chrysopid larva, since it has been described on several occasions by different writers. The larvae begin to feed shortly after having emerged from the egg shell, if food is available, and, although they are usually hungry at that time, they may remain between one and two days without food. A lot of newly hatched larvae were left 38 hours without food and the results were that 50 per cent of these died from starvation, the remainder were in good condition and fed and developed normally.

The duration of the larval stage varies between 14 and 28 days and their feeding period between 13 and 27 days. The full grown larva quits feeding about one day before it spins its cocoon; at that time it absorbs a large quantity of food and remains almost motionless until the spinning operation begins.

Several larvae were collected in the orchards during the summer and were reared in captivity in order to secure newly emerged adults for egg laying experiments. These larvae were generally found on the under surface of the peach leaves, although a few could be seen on the twigs and on the trunks of the trees. The activity of chrysopid larvae is rather limited and depends largely on the quantity of food available; if food is abundant they will absorb a large quantity at a time and then remain almost motionless until they are ready to absorb a new supply of food. In their advanced stages the larvae may live without food for as long as 6 days; this was observed in a few experiments carried out for that purpose. One single larva was still alive at the end of a period of 8 days, but died shortly after from starvation, on account of being too weak to absorb any food.

A series of experiments was also carried on to find out the total number of peach moth eggs devoured by chrysopid larvae. For this purpose three larvae of different ages were used, one being one day old, another 5 days old and the third one 10 days old. These, after starving for one day, were placed in a separate glass vial with a peach leaf containing from 20 to 25 peach moth eggs. During the period of ten minutes the one day old larva sucked 4 eggs, the 5 day old one 7 eggs and the 10 day old nine eggs. Twenty-four hours later all the eggs had been sucked with the exception of experiment no. 1, in which a few eggs remained untouched. In order to find out the approximate number of peach moth eggs required to feed chrysopids during their larval stage, the newly hatched larvae were allowed to feed on these eggs until they were ready to pupate. The results have shown that 620 eggs were used for one and 613 for another, making an average of 616.5 eggs per larva.

Similar experiments were carried on to find the number of peach moth larvae required during the larval feeding period of the chrysopids. In this case 3 newly hatched larvae were used and one new peach moth larva was fed to them every other day. From the time they began to feed until they were full grown 25 larvae were required or 8.3 larvae for each. The peach moth larvae used in this case were all full grown.

Observations in the orchards have shown that the chrysopid larvae were more abundant at the time the eggs of the second peach moth generation were at their peak. Counts which were made at different points at that time indicated that from 50 to 60 per cent of these peach moth eggs were sucked by the chrysopid larvae. Similar counts of the third generation indicated a decrease, the destruction being only 20 to 45 per cent.

A considerable number of peach moth eggs parasitized by *Trichogramma minutum* Riley were also destroyed by the chrysopid larvae, while on the other hand, this parasite destroyed many of the chrysopid eggs. A parasitism running from 5 to 12 per cent was noticed on several occasions.

It has been found impossible to determine the number of peach moth larvae destroyed by the chrysopids in the orchards and, although we have a very vague idea of this destruction, it can be stated that quite large numbers are destroyed when they migrate from twigs to fruit.

Cocoons—

The cocoons of chrysopids, in which they transform into adults, are of white silk and spherical in shape. They were found mostly on the under surface of the leaves, although several were found attached to infested twigs and fruit. This would indicate that oriental peach moth larvae were devoured while attempting to migrate from the twigs to the fruit or to enter into the fruit.

The duration of the pupal stage under natural conditions varies between 8 and 22 days. The matured pupae emerge from the cocoons through a circular opening at one end, a circular lid may be seen hanging on this opening by the means of a few threads. Different views have been published as to the exact manner in which this lid is cut so regularly by the matured pupa, but the process has not been observed by the writer.

Adults—

The adults are very well known to everybody. They are sometimes called Golden Eyes because of their shining golden yellow eyes; but they are more frequently called lace-wings on account of the delicacy and the beauty of their structure.

Very little study of this stage was made during the summer. Work was concentrated on collecting as many adults as possible in the orchards, with a view to getting eggs in quantity to study the larval stage more in detail. Wire screen cages, the same as the ones used for oriental peach moths, were used for securing oviposition. 10 adults, 5 males and 5 females, were placed in each cage with burdock leaves infested with black aphids, to allow them to feed and also obtain sufficient moisture. A peculiar feature was that very few eggs were laid on the leaves, most of them being deposited on the screen and the top of the cage which was of factory cotton.

Since the females were not reared in the laboratory, no strict record was kept as to the number of eggs laid. The only data available is a case where four females, which were taken from the orchard, deposited 130 eggs and only lived 12 days. These were probably old and had deposited some eggs before being taken into captivity.

CONCLUSION

While it would be difficult to give definite data as to the amount of control of oriental peach moth by the chrysopids this year, it may be stated that they have played an important part in conjunction with the parasites and other natural factors in the remarkable reduction in the peach moth infestation throughout the Niagara Peninsula this year.

THE BIOLOGY OF CANADIAN BARK-BEETLES *

THE SEASONAL HISTORY OF DENDROCTONUS RUFIPENNIS KY. IN NORTHERN ONTARIO.

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This bark-beetle is locally distributed over the forested areas of Quebec and Ontario, extending westward into Manitoba; in the United States, it has been recorded from Wisconsin and Michigan.

The insect has been found breeding in fallen white pine and jack pine, and, within recent years, has also been recorded from red pine.

The prevalence of the species is apparently governed to a certain extent by the amount of suitable breeding material available, though it seems to be absent from many localities where there is an abundance of pine culls and windfalls. The records of the species in Canada are not very numerous; it was observed in abundance in the Algoma district of Northern Ontario and specimens have been taken in Algonquin Park, Ont., near lake Kipawa, Que. and in the Riding Mountains, Man.

The adult beetle is slightly more than one quarter of an inch in length; the thorax is dark brown or black in colour and the elytra are dark red. It can be readily distinguished from *Dendroctonus valens* Lec., which is the only other species of the genus breeding in pine in Eastern Canada, by its slightly smaller size and dark thorax; in *valens*, the thorax and elytra are, as a rule, of a uniform brick-red colour.

In 1925, *Dendroctonus rufipennis* Ky., was taken in numbers near Frater in the Algoma district of Ontario where numerous colonies were found breeding in windthrown white pine and red pine.

Several cages were constructed for the purpose of studying this species, the insects being kept under close observation for a period of nearly three years. In addition to cage studies, logs of pine containing broods of this species were also watched carefully under natural conditions.

Flight takes place in the spring; if the weather conditions are favourable, emergence may occur towards the end of May, though there is rarely much activity until the first or second week of June. The entrance to the egg-tunnel is almost invariably located on the underside of the trunk when tunnels are cut in fallen timber. The tunnels are about seven or eight inches in length, slightly sinuate, and follow the grain of the wood.

*Contribution from the Division of Forest Insects, Entomological Branch, Department of Agriculture, Ottawa.

When the egg-tunnel has been completed, short food-tunnels are sometimes formed which branch out a short distance from the egg-tunnel, usually at the distal end. The eggs are usually deposited in two layers, though occasionally only one layer is found. The eggs hatch in July and the young larvae feed in congress until ready for hibernation: at this time they are about one-third grown.

In the following spring, the larvae re-commence feeding, communally; growth is rather slow, however, and it is not until the middle of July or the first week of August that the larvae are mature; pupation takes place in individual cells cut rather deep into the surface of the wood.

The young adult beetles appear about the middle of August; they seem to be very lethargic even in hot weather and when removed from the bark and placed in the sun, could not be induced to fly under any circumstances. There is, however, extensive feeding throughout the autumn months until the advent of the cold weather. In feeding, the beetles cut typical food-tunnels which engrave the surface of the wood rather deeply.

There is no emergence whatever in the late summer and beetles maturing in August do not leave the brood tree until the following May or June. The whole life-history from egg to the emergence of the beetle, therefore, occupies a period of nearly two years, the first winter being passed as small larvae and the second as young adult beetles.

Parent beetles at Frater were not observed to cut more than one set of tunnels. In some instances, the beetles survived the winter in company with their progeny, but died in the spring without attempting to breed. In most cases the parent beetles died in their original egg-tunnels before winter.

Dendroctonus rufipennis Ky. appears to be rather a feeble species and attempts to breed in living timber have, in our experience, always resulted in failure. Pitch-tubes of this species have occasionally been noted on living trees; in every case, however, the tunnels were drowned out by a heavy flow of resin before any eggs could be laid. Even in windthrown trees, there is often sufficient resin to overcome the insects.

SOME ERYTHRONEURA (GRAPE LEAF HOPPERS) OF THE MACULATA GROUP. (HOMOPTERA, CICADELLIDAE)

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The genus Erythroneura was divided by W. L. McAtee and later confirmed by Wm. Robinson, into several groups by the venation of the front wing. The *maculata* group was characterized particularly by the absence of the M-Cu cross-vein and by the base of cell M_4 being angulate. In dissecting and studying the male genitalia of several hundred specimens of this group a good many undescribed forms have been found. It is the purpose of the present paper to begin a study of the entire group, redescribing named species where necessary and adding the new forms. Drawings and photographs have been made but will be published later.

In this group, as in the oblique series, only the outer end of the styles and the oedagus are found to be diagnostic but unlike the latter the pygofer hooks have excellent characters. Specimens in this series are very easily dissected, much more so than in the oblique group. Another noticeable fact in comparison with the latter is the almost entire absence of processes on or at the base of the oedagus.

Since the group gets its name from *Erythroneura maculata* (Gill.), that species will be considered first.

1. **Erythroneura maculata** (Gill.)

Typhlocyba comes var. *maculata*, Gillette, C. P. Am. Typhlocybinae p. 764, 1898.

The following is a description of the male type, No. 3448 in the U. S. N. M.

General ground color pearly white, markings cherry red. Vertex marked with median elongated red spot. Pronotum with triangular red spot at each anterior angle and an elongate, heart-shaped spot on disc not touching either margin. Scutellum with very small bright red spot at either basal angle and much larger round spot at apex. Tegmina with following red markings; clavus; small round dot near base; much larger almost rectangular spot near middle and elongate spot at tip; corium, small round spot near humeral angle; elongate, triangular spot at anterior end of costal plaque, more or less rectangular spot above and opposite middle of costal plaque; dash of red color along Cu, R, and M, and portion of the cross-veins from costal margin inward. A round black spot in base of cell M_4. Venter stramineous with exception of red spot on mesopleura and reddish tinge on upper part of face. Length 2.8 mm.

Genitalia. Pygofer hook short, sword-shaped. Style with medium foot; large heel; straight base; anterior point short, slightly less than right angle; posterior point more than half as long as foot, narrow with converging sides. Oedagus in dorsal view, short with very broad base gradually narrowing almost to tip where it broadens again to tip, two lateral slightly retrorse processes at tip, about half as long as shaft.

Type, male; Onaga, Kansas, F. F. Crevecoeur. No. 3448, U. S. N. M.

There is more than one species represented in the cotype series in the U.S.N.M. W. L. McAtee in his paper "Key to the Nearctic Species and Varieties of Erythroneura", Trans. American Ent. Soc., XLVI, 267-322, establishes the above specimen as the type of this species. Wm. Robinson, in the University of Kansas Science Bulletin Vol. XVI, No. 3, March, 1926, figured a species with entirely different male characters as *maculata* (Gill.) which will now have to be described as new.

Maculata is more slender, with a rather pointed head. It occurs far less frequently than most of the other *maculata*-like species.

2. **Erythroneura gillettei** n. sp.

General ground color semihyaline near tip of tegmina to white. Vertex narrow with acute apex: median, red, rectangular, blotch at tip, connected to base by narrow red stripe; continued almost across pronotum by wider parallel-sided vitta; also small red dash posterior to inner angle of each eye. Scutel-

lum with short red line in basal angles and median spot on anterior margin. Clavi with red spot near middle and tip.

Red vittae on M. and Cu from cross-veins to opposite posterior end of costal plaque, ending in knob or larger spot. Cross-veins red. Small black spot in posterior end of costal plaque and base of Cell M_4. Anterior margin of face with red band connected with dorsal stripe. Venter stramineous. The red on and near cross-veins gives a red banded appearance.

Genitalia. Pygofer hook single, rather short and heavy, sword-shaped. Style with long foot; heel medium; anterior point short, slightly less than right angle; posterior point sharp, fourth as long as foot. Oedagus of medium length heavy shaft curved dorsally with two pairs of lateral processes, one arising one third distance from base, each about as broad as shaft, the other at tip of shaft, longer and much narrow, recurving, resembling an anchor.

This species closely resembles *E. maculata* (Gill.) and no doubt has been confused with it. It may be easily distinguished from that species by the parallel sided median red vittae of the vertex and pronotum and by absence of red spot on tip of scutellum.

Holotype; male, Wabash Co., Ill., 3-30-29. R. H. Beamer.

Allotype and 4 *paratypes;* same data.

3. **Erythroneura noncuspidis** n. sp.

General ground color pearly white. Vertex with median longitudinal bright red stripe, somewhat swollen at apex. Some specimens show very small red blotches in front of eyes. Pronotum with median, longitudinal, rectangular, red stripe arising on posterior margin but usually not reaching anterior, when it does, enclosing circular white spot larger than the stripe, red boundary of this circle very narrow. Red stripe behind each eye almost encloses white spot at each end. Scutellum with very small triangular red spot in each basal angle and diamond-shaped red tip. Coria with the following red marks; bright red anchor-shaped spot near center of clavus and another blotch just before tip, broken irregular sided line encircling costal plaque, irregular sided blotch on M and Cu just before cross-veins. Cross-veins red. Dark spot in base of cell M_4 and posterior end of costal plaque. Bright red bracket-shaped line crossing anterior portion of face, remainder of venter light.

Genitalia. Pygofer hook shorter and heavier than in *E. gillettei* Beamer, bent. Styles with long foot; arcuate base; moderate heel; anterior point about a right angle; posterior point slightly less but a little more pronounced, scarcely any points to toe. Oedagus heavy, about twice as long as broad in dorsal views, narrows tip and ends in two lateral arcuate processes which are about two thirds length of shaft.

Holotype; male, Lawrence Co., Ill., 3-31-29, R. H. Beamer.

Allotype; female, Wabash Co., Ill., 3-31-29, R. H. Beamer.

Paratypes; numerous specimens of both sexes from southern Ill. collected by R. H. Beamer and P. W. Oman.

This species is close to *E. gillettei* n. sp. but may be separated from that species by the following characters; lack of basal median red spot on scutellum; the median red vittae of pronotum not reaching anterior margin, and by male genitalia.

4. **Erythroneura stephensoni** n. sp.

General ground color milky white. Vertex with a semblance of three orange dots in form of triangle, middle one more or less of a dash at base. Pronotum, if marked, only with slightest median longitudinal dash of orange. Tegmina often not marked on anterior two thirds, sometimes, with small orange spot in base of clavus, one near middle, and third near apex. Coria marked with orange as follows: two orange spots on costa between humeral angle and costal plaque, one opposite middle spot on clavus, and all area between costal plaque, cross-veins and mesal margin more or less peppered and splotched with orange. Cross-veins spotted also. Dash at posterior end of costal plaque, spot in base of cell M_4 and apex of tegmina dusky. Face and venter more or less dusky.

Genitalia. Pygofer hook single; of medium length, rather narrow and slightly curved, almost parallel sided. Style with foot of medium length quite wide for its length; base straight; heel small; anterior point small, less than a right angle; posterior point very short, sharper than anterior. Oedagus of medium length; in lateral view curved almost at right angles to its base, almost parallel sided throughout, with many short low ridges giving it a scaly appearance

Holotype; male, Bowie Co., Tex. 8-16-29. R. H. Beamer.

Allotype; female, Le-Flore Co., Okla., 5-24-28. R. H. Beamer.

Paratypes; Males Bowie Co., Tex. 3; Johnson Co., Ill., 3, females Le-Flore Co., Okla., 14, Tuskahoma, Okla., 11, Johnson Co., Ill., 8, Clay Co., Ill., 1, Bowie Co., Texas 9.

This is a beautiful species with very dainty markings. It occurs on oak.

I take pleasure in naming this *Erythroneura* for Mr. Lyle Stephenson of Kansas City, Missouri, who is an ardent supporter of Entomology and was with me when I first collected this species.

5. **Erythroneura lunata** McA.

A series of 7 females and 4 males of this beautiful species was taken on oak in Southeastern Oklahoma and Northeastern Texas. Comparison with the types of *E. lunata* McA. at Urbana Ill., showed them to be unquestionable this species.

Genitalia. Pygofer hook single, very short, of less than medium width, strongly curved ventrally near base. Style with foot large; base almost straight, heel medium; anterior point very short and sharp; posterior point straight, about as long as base of foot, quite narrow, sides almost parallel. Oedagus short, straight, not much enlarged toward base, with many backward protruding spines and scales on shaft.

6. **Erythroneura contracta** n. sp.

General ground color white with yellowish tinge in some specimens on vertex and along costal margin. Vertex with three red circles or semblance of circles, touching and enclosing white areas, one in each basal corner touching eyes and one on median line touching base and almost vertex, red of circles very narrow. Pronotum with red blotch posterior to each eye and median V usually not touching base and poorly, if at all, connected to anterior margin. Scutellum with basal angles

broadly yellow margined by thin line of bright red on inner and posterior margins. This character seems to separate it from a good many closely related forms. Tip with bright red spot. Tegmina with following red marks; clavus with anchor-shaped mark, not basally enlarged, occupying median portion of basal half and another spot just before tip; coria with spot midway between humeri and costal plaque, red dash at anterior end of plaque, heavier thicker one on M opposite anterior end of costal plaque and about half as long, another dash on M and Cu between this and cross-veins and small one near posterior end of costal plaque, cross-veins and connecting veins more or less red. Dark spot in posterior end of costal plaque and one in base of Cell M_4. Face anteriorly with narrow V-shaped cross band. Legs sometimes pink. Venter otherwise stramineous.

Genitalia. Pygofer hook single, fairly heavy, slightly narrower near base than at middle, contracts about one-fourth distance from tip to less than half its former width and curves slightly outward. Style with moderate foot; sinuate base; large heel; anterior point very short, slightly less than a right angle, posterior point narrow, less than half as wide as foot at narrowest place, about two-thirds as long as base. Oedagus in dorsal view wide, about twice as long as width measured one-third distance from base, narrows evenly from this point to tip where it contracts abruptly and as abruptly widens again into a lip-like tip, outer third with numerous short backward pointing teeth.

Holotype; male, Douglas Co., Kan., 1927. R. H. Beamer.

Allotype; female, Clay Co., Ill., 3-31-20. R. H. Beamer. And the following male *paratypes;* Clay Co., Ill., 15, Anderson Co., Kans., 1, Douglas Co., Kan., 1927, 2, Nashville, Tenn., 1927, R. H. Beamer, 1, Johnson Co., Ill., 8, Lawrence Co., Ill., 3, White Co., Ill., 1, Wabash Co., Ill., 6, Gallatin Co., Ill., 12.

7. **Erythroneura gemina** McAtee

Erythroneura maculata var. *gemina* McAtee, W. L., Trans. Amer. Ent. Soc., xlvi, 267-322 Aug. 26, 1920.

"Whitish to pale yellowish, with only the dark spots in bases of fourth apical cells present.

Length, 2.68 mm,; vertex: LM 6 LE 3, WA 17.5, OA 6, OP 10, OH 15: Pronotum: L 10, W 19; tegmen 13-56.

Type, female; Virginia opposite Washington, District of Columbia, June 15, 1902, (U. S. N. M.). Allotype, male; Scott's Run, Virginia, July 4, 1918, (W. L. McAtree) (W.L.M.); this specimen is not in condition for measurement."

General ground color semihyaline to opaque white with tinge of yellow. Markings orange in summer specimens more nearly red in winter. Vertex with large, central orange ʘ connected to eyes by orange bar, giving somewhat appearance of five white spots. Pronotum with two orange dashes behind each eye and median V-shaped mark; base of V longer than arms and rectangular, touching posterior margin, arms U-shaped and very narrow, touching anterior margin. Scutellum with tip orange and basal angles yellow with dash on posterior margin darker, either orange or red. Tegmina with following orange

marks; anchor-shaped spot on base of clavus touching claval suture, and long narrow spot near tip; coria with oblique dash near humeral angle and zigzag vitta arising on costa at anterior end of costal plaque, touching claval suture, surrounding costal plaque, to join another oblique mark arising at posterior end of costal plaque, crossing to claval suture just before tip, then angling back to join cross-veins in region of M_1. Black dash in anterior end of costal plaque and larger black spot in base of cell M_4. Cross-veins either red or orange. Apex of tegmina more or less fuscous. Venter stramineous.

Genitalia. Pygofer hook single; almost straight; rather less than medium size.

Style with large foot; base slightly sinuate; heel large; anterior point very short, about a right angle; posterior point slightly longer than foot, curved so as to form a large U with base of foot, very narrow, sides almost parallel. Oedagus in lateral view curved dorsally almost at right angles to base; shaft heavy at base, tapering evenly to ventrally rounded tip; small teeth on inner basal two-thirds, backward projecting teeth on outer half.

This species was swept from oak in Oklahoma. Numerous specimens have been dissected from Kansas, Oklahoma and Illinois and the genitalia found to agree in every particular with those of the specimen from McAtee's collection.

8. **Erythroneura curvata** n. sp.

General ground color white tinged with yellow. Color markings bright red in winter specimens, mostly made up of dots or blotches, rarely of any great length, exact shape and pattern of markings variable. Vertex with two broad comma-shaped marks arising on median line, curving out to almost touch anterior corner of eyes, also narrower transverse dash on median line just before apex. In many specimens these red marks run together to form a central white spot with four other surrounding spots. Pronotum with triangular red spot on anterior margin back of each eye and triangular or heart-shaped one near center of disc. Scutellum with tip red, basal angles yellow, with long angular dash of red on posterolateral margin and very thin red line on inner margin. Tegmina marked as follows: clavus with red spot at base, one near middle and one almost at tip, first two may be connected into anchor-shaped mark; coria with red spot on costa opposite first claval spot, dash about anterior end of costal plaque with spot at its inner end, two more or less irregular, connected spots on line between posterior end of costal plaque and base of cell M_4. Costal half of cross-veins red. Small spot in posterior end of costal plaque and larger one in base of cell M_4 black. Tips of tegmina more or less fumose. Face with bracket-shaped red mark and mesosternum with red spot near base of wings. Remainder of body stramineous.

Genitalia. Pygofer hook double, outer part shorter, narrower and almost straight, inner part longer, thicker and inwardly convex near tip. Style with foot long; heel large; anterior point short, less than a right angle; posterior point shorter, equal to or greater than a right angle. Oedagus, short in lateral view, almost straight, rounding on both margins to rather blunt tip; greatest width just before tip.

Holotype; male, Douglas Co., Kans., 1927, R. H. Beamer.

Allotype; female, Wabash Co., Ill., 3-31-29, R. H. Beamer.

Paratypes; males, Anderson Co., Kans., 7, Cloud Co., Kans. 1, Lawrence Co., Ill., 7, Douglas Co., Kans., 4, Leavenworth Co., Kans., 4, Clay Co., Ill., 2, Cherokee Co., Kans., 2,Wabash Co., Ill., 3, White Co., Ill., 1, Gallatin Co., Ill., 4, Romsey Co., Minn., 1.

This species is very close to *E. carmini* Beamer but can usually be separated from it by the red markings consisting of spots rather than vittae and always by the shape of the inner branch of the pygofer and much smaller oedagus.

9. **Erythroneura impar** n. sp.

General ground color semihyaline to white. Color markings red or orange. Vertex with V-shaped median basal mark, transverse median dash which forms more or less of circle about white spot, and spot at anterior margin of eye. Pronotum with blotch posterior to eye, tending to be hollowed out both anteriorly and posteriorly and median heart or V-shaped spot. Scutellum with spot on tip, basal angles yellow often outlined with red or orange. Tegmina with following marks; clavus with anchor-shaped spot on basal two thirds and large spot almost to tip; coria with spot on costa near humeral angle, another arising on costa at anterior end of costal plaque, more or less surrounding it, crossing almost to claval suture then back to cross-veins, partially red. Small black spot in posterior end of costal plaque and base of cell M_1. The color markings of this species are quite variable. They may be almost continuous lines or they may be spots.

Genitalia. Pygofer hook double, outer about one half to two thirds as long as inner. Style with long slender foot; large heel; anterior point short, acute; posterior point larger than a right angle, practically absent. Oedagus in lateral view very broad, almost as wide at tip as at base, tip rounded.

Holotype; male, Anderson Co., Kan., R. H. Beamer.

Paratypes; 10 males same data; 16 males, Douglas Co., Kans., R. H. Beamer; 1 male Douglas Co., Kans., P. B. Lawson; 3 males Johnson Co., Ill., and 2 males Lawrence Co., Ill., P. W. Oman and R. H. Beamer.

10. **Erythroneura brevipes** n. sp.

General ground color semi-hyaline to opaque white. Color markings orange. Vertex with a median stripe divided near base to enclose a white spot; a very slight dash of color just before eye. Pronotum margined except at base by a band slightly enlarging anteriorly enclosing a white spot which is larger than that of vertex. The base of this median stripe begins to enlarge and passing to the scutellum encloses another white spot, uniting again to form an orange tip. Basal angles of scutellum yellow. Tegmina with following orange pattern; anchor-shaped mark occupying basal half of clavus, its outer edge following claval suture, its apex touching vitta from anterior end of costal plaque and inner margin on mesal margin of clavus; a rather long spot just before tip of clavus; corium with an oblique dash midway between humerus and costal plaque touching claval mark near its base, a vitta enclosing costal plaque touches apex of anchor, basal end of other claval spot, apex of clavus and cross-veins, following these back to costal margin. Black spot in base of cell M_4 and posterior end of costal plaque. Tip of tegmina more or less fumose. Anterior portion of face crossed by an angulate rather V-shaped

band, remainder of venter stramineous. Hind tibia with one row of black spines and a few in second row.

Genitalia. Pygofer hook single, rather long, scarcely more than a third as wide near base as at middle, tip tapers rapidly to sharp point, ventrally concave in thickened portion. Style with short foot, almost as wide as long; base almost straight; heel small; anterior point short and sharp; posterior point shorter and greater than a right angle. Oedagus short and thick; in lateral view dorsally curved growing larger to a rounded tip, covered externally with heavy retrorse spines giving it the appearance of a pine cone with various kinds of scales.

Holotype; male, Le Flore Co., Okla., oak, May, 24 1928, R. H. Beamer.

Allotype; female, and 7 male and 22 female *paratypes,* same data.

11. **Erythroneura nigriventer** n. sp.

General ground color semi-hyaline to yellowish white. Vertex with three white circular spots and two half circular ones more or less bordered by red, a heavier red spot on apex. Pronotum with red splotches back of eye and median more or less V-shaped one which does not reach posterior margin. Scutellum with tip red, basal angles yellow, outlined with red except on anterior margin. In one female the scutellum is more or less dusky. Tegmina marked with red as follows; anchor on clavus and another heavy blotch before tip, coria with a spot on costa near humeral angle, one at anterior end of costal plaque, one opposite break in spots on clavus, vittae on longitudinal veins from even with posterior end of costal plaque to cross-veins. Cross-veins red. Tips of tegmen more or less smoky. A black spot in posterior end of costal plaque and base of cell M_4. Face with a V-shaped red crossband. Venter and dorsum of abdomen quite dark. One row of black spines on hind tibia. These last two characters are outstanding in this species.

Genitalia. Pygofer hook short and stout. Enlarged near middle to at least four times basal width, strongly incurved and tapering to a narrow almost straight apex. Style with medium foot; large heel; anterior point small, about a right angle; posterior point as long or longer than foot, sides almost straight and parallel. Oedagus very short, curved in lateral view, with rounded tip and parallel sides.

Holotype; male, Johnson Co., Ill., 3-30-29, R. H. Beamer.

Allotype; female, Gallatin Co., Ill., 3-31-29, and two female *paratypes,* Johnson Co., Ill., 3-30-29, R. H. Beamer.

12. **Erythroneura bifida** n. sp.

General ground color yellowish-white with more or less orange on the vertex and pronotum. Pronotum with an orange heart-shaped mark on disc; indications of other marks on anterior angles and on vertex. Summer specimens account for this indefinitness. Tegmina with two very bright red spots. Anterior one formed by the basal third of each clavus being red. Posterior by red outer third of clavi and a blotch on coria crossing cell Cu. Indications of other red spots are present in some specimens as well as some evidence of yellow markings. Base of cell M_4 with black spot.

Genitalia. Pygofer hook single, growing larger toward apex curving in and ending in a bifid tip. Style with medium foot; base straight; heel large; anterior point less than a right angle about as long as foot is wide at apex; posterior point longer than foot, slightly outcurved, almost parallel sided. Oedagus very small; scarcely three times as long as broad in lateral view; slightly broader in dorsal aspect, covered on outer two-third with short stubby spines.

Holotype; male, Caddo Parish La., 8-19-28, R. H. Beamer.

Allotype; female, 13 female and 14 male *paratypes,* same data; 1 male, Caddo Parish La., 9-19-28, J. G. Shaw; 1 female, Natchitoche Pat., La., 8-16-28. R. H. Beamer.

This species seems to be quite closely related to *E. rubranotata.* It can be separated from that species by its larger size and by the bifid pygofer hook.

A LIST OF THE CRANE-FLIES OF QUEBEC (DIPTERA) II*

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The first list under this general title (Can. Ent., 61: 231-236, 247-251; 1929) recorded from the Province of Quebec 1 species of Tanyderidae, 2 species each of Ptychopteridae and Trichoceridae, and 139 species of Tipulidae. Collections made in 1929 have added to this list 69 species of Tipulidae that are recorded at this time, such species being preceded by an asterisk (*). To this total of 208 species, at least 100 species must be added before the record for Quebec can be considered as being approximately complete.

The detailed collections of 1929 represent four major sources of material. Collections made in Canadian Labrador by Mr. W. J. Brown and now preserved in the Canadian National Collection added several Arctic crane-flies to the list. The conditions under which these specimens were taken have been indicated by McDunnough (Can. Ent., 62: 54-62; 1930). The facies of the fauna of the vicinity of Bradore Bay is very similar to that found in Labrador (C. W. Johnson, Diptera of Labrador, Psyche, 36: 129-146; 1929). The second and largest single source of additions to the list was likewise included in the Canadian National Collection, having been made in the vicinity of Knowlton, Brome County, in 1928 by Messrs. Adams and Fisk, and in 1929 by Messrs. McDunnough, Milne and Walley. A third important collection was made at Shawbridge in the Laurentian Mountains by Mr. Albert F. Winn and is now preserved in the Peter Redpath Museum of McGill University. The fourth source and the only one in which the present writer took an active part in the collection of material was the result of a trip taken between June 10 and 24, 1929, to Percé Rock, Gaspé, by Dr. G. C. Crampton and myself. A brief itinerary and discussion of certain of the best collecting localities are given.

Leaving Maine at Houlton, the trip northward was routed along the St. John River, New Brunswick, from Woodstock to Edmunston, entering Quebec below Lake Temiscouata, where the first important collections were made on June 17th at Notre Dame du Lac. Continuing to the north, collections were made along a roadside stream at St. Honore and at the foot of the great Chute

*Contribution from the Entomological Laboratory, Massachusetts Agricultural College.

at Riviere du Loup. No collections were made along the St. Lawrence until Mt. Joli was reached. Following southward along the western end of the Gaspe Peninsula, collections were made at Ste. Angèle-de-Mérici, Lake Matapedia, Causapscal, and at intervals along the beautiful Matapedia Valley, between Ste. Florence and Matapedia on June 18th. The most interesting series taken here were from along small mountain streams flowing into the river. On this date, conditions were almost as noted three weeks earlier at Amherst, Mass., with *Clintonia* in bud and *Coptis* barely in bloom. This belated nature of the season permitted us to capture only the early spring crane-flies but it is believed that not many of these were missed. From Matapedia, we followed eastward along the south shore of Gaspé, making collections at New Richmond, mouth of the Cascapedia R., June 19th; St. Charles-de-Caplan; and at the west branch of the River Pabos, 3 miles west of Chandler, where Dr. Crampton in 1928 made his notable discovery of one of the great rarities in the lower Diptera, *Protoplasa* (Can. Ent., 61: 70-71; 1929). Here we were so fortunate as to be able to discover the larvae of this highly interesting fly and finally to rear it to the adult condition. At and near Percé, the season was very belated and only a few vernal species of crane-flies were in evidence. On the return trip over this same route, a detailed collection was made at Escuminac East, 30 miles east of Matapedia. This particular secluded locality showed the season much more advanced, being fully ten days later than noted at places only 100 miles to the east. I have seldom if ever seen a place that gave better promise of rich crane-fly collecting than this station at Escuminac East, lying on the exact boundary between the municipalities of Nouvelle and Escuminac, on property owned by Mr. George Kerr. The stream divides and ramifies through the open mixed woodland amongst a rich growth of ferns and other low herbage, and at this date, June 21st, the air was simply teeming with crane-flies of the vernal fauna, a total of 24 species being taken. The complete list for this particular locality throughout the season must be very large. Two miles east of Matapedia village, at a place called herein "Flatland", we encountered large swarms of *Protoplasa* adults, as discussed under the species. A small gorge cut by a tiny stream flowing southward down the mountain side into the Restigouche River proved a very rich collecting locality. The strata of rocks had been tilted into an almost vertical position and supported characteristic trees, as white cedar, yew, yellow birch and mountain maple, together with abundant liverworts and mosses. The rich Tipulid fauna of this place has been listed under the common term "Flatland" which applies to both the Quebec and New Brunswick sides of the head of Chaleur Bay.

Collectors of the 1929 material as above indicated are recorded by their initial letters, as follows:

JAA=J. A. Adams
CPA=C. P. Alexander
WJB=W. J. Brown
GCC=G. C. Crampton
GHF=G. H. Fisk
JM=J. McDunnough
LJM=L. J. Milne
GSW=G. S. Walley
AFW=A. F. Winn

TANYDERIDAE

Protoplasa fitchii (O.S.) Larvae were found in the sandy margins of the west branch of the River Pabos, three miles west of Chandler. From these larvae, an adult female later emerged, proving the identity of the species. The details of structure of this larva and pupa have been discussed by the writer in another publication (Proc. Linn. Soc. New South Wales, vol. 55, 1930, *in press*). At Flatland, 142 miles to the west, adult flies were taken in some numbers, swarming after sunset over the road near a small stream. These swarms, which were composed in great part of males, were associated with small numbers of a crane-fly, *Eriocera longicornis* (Walk.). *Protoplasa* adults head into the wind and the numbers of participating individuals varies very notably from minute to minute.

PTYCHOPTERIDAE

Bittacomorpha clavipes (Fabr.) Knowlton, July 24-25, 29 (LJM); St. Honore, June 17, 29 (CPA).

TIPULIDAE

Subfamily *Tipulinae*

Tipula abdominalis (Say). Knowlton, June 26, 28 (GHF), July 9, 29 (LJM); Mississquoi R., Bolton, Knowlton, July 13, 29 (GSW).

Tipula angustipennis Lw. Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Riviere du Loup, June 17, 29 (GCC).

Tipula apicalis Lw. Oxford Lake, July 10, 20 (AFW); Fulford, June 20; Knowlton, July 25, 29 (LJM).

**Tipula balioptera* Lw. Bradore Bay, July 19-23, 29 (WJB).

Tipula bella Lw. Knowlton, Aug. 12, 29 (GSW).

Tipula bicornis Forbes. Fulford, June 22, 29 (GSW); Knowlton, June 26, 28 (JAA), June 21-24, 29 (GSW).

**Tipula centralis* Lw. Bradore Bay, July 19, 29 (WJB).

Tipula dejecta Walk. St. Hilaire, May 29, 20 (AFW); Como, May 16, 20 (AFW).

**Tipula entomophthorae* Alex.. Knowlton, July 12, 29 (GSW); Harrington Harbor, July 3, 29 (WJB); Mecotina Sanctuary, June 8, 29 (WJB).

Tipula eluta Lw. Aylmer, Aug. 23, 28 (GHF).

Tipula gaspensis Alex. Bradore Bay, July 19-24, 29 (WJB).

Tipula grata Lw. Knowlton, July 24-Aug. 12-14, 29 (LJM).

Tipula hebes Lw. Shawbridge, Aug. 1, 29 (AFW); Knowlton, July 24-Aug. 29, 29 (LJM & GSW).

Tipula hermannia Alex. Shawbridge, July 2-10, 29 (AFW); Knowlton, July 9, 29 (GSW).

Tipula iroquois Alex. St. Honore, June 17, 29 (CPA); Flatland, Gaspé, June 22, 29 (CPA).

Tipula latipennis Lw. Knowlton, July 4, 28 (GHF), June 23-July 24, 29 (LJM) & GSW); Amherst Is., Magdalen Is., July 15, 17 (A. G. Huntsman).

Tipula monticola Alex. Knowlton, June 14, 28 (GHF).

**Tipula nebulipennis* Alex. Old Fort Is., July 13, 29 (WJB); Bonne Esperance, July 14, 29 (WJB).

Tipula nobilis (Lw.) Knowlton, June 12, 28 (JAA), June 21, 29 (GSW).

**Tipula noveboracensis* Alex. Knowlton, June 26, 28 (GHF), July 9, 29 (LJM); Mississquoi R., Bolton, July 13, 29 (GSW).

Tipula parshleyi Alex. Matapedia, June 18, 29 (CPA).

Tipula penobscot Alex. Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); L. Matapedia, June 18, 29 (CPA).

**Tipula rohweri* Doane. Amherst Is., Magdalen Is., July 12, 17 (A. G. Huntsman). Recorded by Dietz (Can. Ent., 52: 5; 1920), possibly an erroneous identification.

Tipula sayi Alex. Shawbridge, Aug. 2-19, 29 (AFW).

Tipula senega Alex. Knowlton, June 12-14, 28 (GHF); L. Matapedia, June 18, 29 (CPA).

Tipula serta Lw. Knowlton, June 14, 28, (GHF), June 21, 29 (GSW); Kazubazua, May 28, 28 (WJB); Mt. Joli, June 17, 29 (CPA); Escuminac East, Gaspé, June 21, 29 (CPA).

**Tipula strepens* Lw. Knowlton, June 14, 28 (CPA).

**Tipula submaculata* Lw. Knowlton, July 25, 29 (LJM).

**Tipula subserta* Alex. Bradore Bay, July 19, 29 (WJB).

Tipula sulphurea Doane. Escuminac East, Gaspé, June 21, 29 (CPA).

Tipula tephrocephala Lw. Knowlton, June 20, 29 (GSW).

Tipula trivittata Say. Amherst Is., Magdalen Is., July 15, 17 (A. G. Huntsman).

Tipula ultima Alex. Shawbridge, September 5-6, 29 (AFW).

Tipula umbrosa Lw.. Knowlton, July 12-Aug. 2, 29 (LJM), Amherst Is., Magdalen Is., July 15, (A. G. Huntsman). Reported by Dietz (Can. Ent., 52: 5; 1920) as *inermis* Doane.

Tipula unimaculata (Lw.). Shawbridge, July 14-Sept. 1, 29 (AFW).

**Tipula vicina* Dietz. Kazubazua, May 28, 28 (WJB); Riviere du Loup, June 17, 29 (GCC).

Tipula youngi Alex. Shawbridge, July 5, 29 (AFW).

**Nephrotoma brevioricornis* (Doane). Shawbridge, Aug. 10, 29 (AFW); Knowlton, July 3-7, 29 (JM).

**Nephrotoma euceroides* Alex. Knowlton, Aug. 2, 29 (LJM).

Nephrotoma ferruginea (Fabr.) Shawbridge, July 4, 29 (AFW); Knowlton, July 30, 29 (GSW), Aug. 2, 29 (LJM); Mt. Joli, June 17, 29 (CPA); Amherst Is., Magdalen Is., July 15, 17 (A. G. Huntsman).

Nephrotoma incurva (Lw.) Boulton Center, Knowlton, June 29, 28 (GHF).

Nephrotoma lugens (Lw.) Queens Park, Aylmer, May 31, 28 (GHF).

**Nephrotoma pedunculata* (Lw.). Shawbridge, June 24, 29 (AFW).

Nephrotoma xanthostigma (Lw.). Shawbridge, Aug. 12, 29 (AFW); Foster July 31, 29 (GSW), Mississquoi R., Bolton, July 5, 29 (GSW).

Dolichopeza americana Ndm. Knowlton, July 12, 29 (GSW); West Bolton Creek, Knowlton, June 26, 29 (GSW).

**Oropeza dorsalis* Johns. Knowlton, July 4-13, 29 (GSW).

Oropeza obscura Johns. Knowlton, June 29, 29 (GSW), July 12, 29 (GSW).

**Oropeza polita* Johns. Knowlton, June 29-July 12, 29 (GSW).

This species was considered by its describer as being merely a race of *obscura* but is in reality a very distinct species. A brief re-description and comparison with *obscura* is given:

Generally similar to *O. obscura* Johns., differing especially in the short antennae and structure of the male hypopygium.

Antennae much shorter than in *obscura,* if bent backward scarcely attaining the root of the haltere. Mesonotum dark brown, nitidous, without stripes. Knobs of halteres darkened. Tarsi more evidently darkened. Wings with the stigmal area paler, not contrasting strongly with the ground-color. Venation: Cell *1st* M_2 narrow at base. Abdominal tergites almost uniformly darkened, not conspicuously bicolorous as in several related species, the outer segment and hypopygium almost black; basal sternites a little brighter but not conspicuously dimidiate. Male hypopygium with the median region of the tergite produced into a quadrate plate that is further produced into a sharp median point; incurved lateral arms of tergite elongate, at tips dilated into spatulate dusky blades, the margins smooth. Outer dististyle black, sinuous, at base dilated and expanded, at tips nearly acute. Inner dististyle much more expanded than in *obscura,* the blade approximately as wide as long.

Oropeza venosa Johns. W. Bolton Creek, Knowlton, June 26, 29 (GSW).

* **Oropeza walleyi** sp. n.

General coloration brownish yellow, the praescutum and scutum with clearly-defined brown areas; head gray; pleura yellowish white, without distinct markings; halteres with slightly infuscated knobs; legs pale brownish yellow; wings brownish yellow, the stigma brown; abdominal tergites obscure yellow with a brown median stripe, the lateral margins not darkened; male hypopygium with the gonapophyses large and conspicuous, the margins irregularly dentate.

Male.—Length, about 9-10 mm.; wing, 11-11.5 mm.

Female.—Length, 11-12 mm.; wing, 12 mm.

Frontal prolongation of head pale yellow; palpi pale, the terminal segment suddenly blackened. Antennae (♂) elongate, the basal three segments (♂) or two segments (♀) yellow, the remaining segments passing into brown, the basal enlargments a trifle darker. Head gray, with a dark median and posterior border, the occiput paler.

Mesonotal praescutum brownish yellow, with three very distinct and clearly defined brown stripes; scutum similar, each lobe with two confluent dark brown areas; scutellum and postnotum pale brownish testaceous. Pleura yellowish white, without distinct dark markings, only the sternopleurite a little darkened. Halteres yellow at base, darkened outwardly, the knobs slightly infuscated. Legs with the coxae and trochanters yellow; remainder of legs pale brownish yellow. Wings brownish yellow, the costal region deeper yellow; stigma oval, conspicuous, brown; obliterative areas before the stigma and across the base of cell *1st* M_2; veins brown.

Abdominal tergites obscure yellow, with a dorso-median brown stripe, the lateral margins pale; sternites yellow, with a dark spot at the incisures, the outer segments more uniformly darkened. Male hypopygium with the caudal

margin of the tergite with a broad V-shaped notch that is extended into a flattened flange bearing a small slender spine at base of notch; lateral arms of tergite expanded at tips into obtuse blades. Outer dististyle long and slender, the base not enlarged. Inner dististyle dilated, produced into a blackened beak that is unequally bidentate. Gonapophyses very large and conspicuous, yellow, the margins irregularly dentate.

Habitat.—Northeastern North America.

Holotype, male, Knowlton, Quebec, July 4, 1929 (G. S. Walley).

Allotopotype, female, July 12, 1929 (G. S. Walley).

Paratopotypes, 3 males and females, June 29-July 12, 1929 (G. S. Walley); *paratypes,* 2 males, Brookview, Rensselaer Co., New York, June 14-21, 1923 (C. P. Alexander).

Type in the Canadian National Collection.

I take great pleasure in naming this species in honor of Mr. G. S. Walley. *Oropeza walleyi* is closest to *O. sayi* Johnson, differing in the more darkened knobs of the halteres and details of structure of the male hypopygium, especially the large, toothed gonapophyses.

Subfamily *Cylindrotominae*

Liogma nodicornis (O.S.) Knowlton, June 12, 28 (JAA), June 21-July 21, 29 (LJM).

Subfamily *Limoniinae*

Limoniini

Limonia (*Limonia*) *cinctipes* (Say) Knowlton, July 2, 28 (JAA), July 21, 29 (LJM); Flatland, Gaspé, June 22, 29 (CPA).

**Limonia* (*Limonia*) *globithorax* (O.S.). Riviere du Loup, June 17, 29 (CPA), at foot of Chute,—this specimen shows cell M_2 of both wings open by atrophy of both *m* and basal section of M_3, leaving the distal section of M_3 lying free in membrane; Matapedia Valley, along mountain stream, June 18, 29 (GCC).

Limonia (*Limonia*) *indigena* (O.S.) Matapedia, Gaspé, June 18, 29 (CPA).

**Limonia* (*Limonia*) *simulans* (Walk.) Knowlton, July 11, 29 (GSW).

Limonia (*Limonia*) *solitaria* (O.S.) Knowlton, July 30-Aug. 6, 29 (GSW).

**Limonia* (*Limonia*) *triocellata* (O.S.) Shawbridge, Aug. 19, 29 (AFW).

**Limonia* (*Dicranomyia*) *adirondacensis* (Alex.). Knowlton, July 10, 29 (LJM).

**Limonia* (*Dicranomyia*) *halterata* (O.S.). Flatland, Gaspé, June 22, 29 29 (CPA).

Limonia (*Dicranomyia*) *humidicola* (O.S) Escuminac East, Gaspé, June 21, 29 (CPA); Percé, Gaspé, June 20, 29 (CPA).

**Limonia* (*Dicranomyia*) *iowensi* (Rogers) Knowlton, July 23-24, 29 (LJM).

Limonia (*Dicranomyia*) *liberta* (O.S.). Knowlton, June 12, 28 (GHF); Notre Dame du Lac, Temiscouata, June 17, 29 (CPA).

Limonia (*Dicranomyia*) *longipennis* (Schumm.). Knowlton, June 20, 29 (GSW).

Limonia (*Dicranomyia*) *nycteris* (Alex.). St. Honore, June 17, 29 (CPA).

Limonia (*Dicranomyia*) *profunda* (*Alex.*). Knowlton, July 26, 29 (LJM); Matapedia Valley, along mountain stream, June 18, 29 (GCC); New

Richmond, Gaspé, June 19, 29 (CPA).

Limonia (*Dicranomyia*) *sphagnicola* (Alex.). Knowlton, July 4, 29 (GSW).

**Limonia* (*Dicranomyia*) *uliginosa* Alex. Mutton Bay, July 11, 29 (WJB); Bradore Bay, July 19-24, 29 (WJB).

These specimens differ from the type-series in the larger size and the longer Sc_1, which exceeds the stigma in length. However, the peculiar male hypopygium is quite the same and I must consider the identification as being correct.

**Limonia* (*Geranomyia*) *canadensis* (Westw.) Flatland, Gaspé, June 21, 29 (CPA).

**Limonia* (*Geranomyia*) *rostrata* (Say) Shawbridge, Aug. 14-Sept. 1, 29 (AFW); Knowlton, July 4, 29 (GSW).

**Limonia* (*Rhipidia*) *fidelis* (O.S.). Knowlton, July 4-Aug. 6, 29 (LJM and GSW).

Limonia (*Rhipidia*) *maculata* (Meig.). Shawbridge, July 2-19, 29 (AFW).

**Antocha opalizans* O.S. St. Johns Co., June 14, 19 (Chagnon).

Antocha saxicola O. S. Lachine, June 19, 29 (LJM); Fulford, June 22, 29 (GSW); Knowlton, June 20-29, 29 (GSW).

Helius flavipes (Macq.). Knowlton, June 23, 29 (GSW).

**Dicranoptycha germana* O.S. Knowlton, July 12-Aug. 2, 29 (LJM).

Pediciini

**Pedicia contermina* Walk. Escuminac East, Gaspé, June 21, 29 (CPA).

**Tricyphona auripennis* (O.S.). Flatland, Gaspé, June 21-22, 29 (CPA). In small gorge, resting on cliff walls and flying overhead.

Tricyphona autumnalis Alex. Tadousac R., Aug. 10, 19 (AFW); Shawbridge, July 27, 29 (AFW).

Tricyphona calcar (O.S.). Mutton Bay, July 11, 29 (WJB); Matapedia Valley, Gaspé, June 18-19, 29 (CPA); Flatland, Gaspé, June 22, 29 (GCC); Escuminac East, Gaspé, June 21, 29 (CPA).

Tricyphona inconstans (O.S.). Shawbridge, Aug. 19, 29 (AFW); Bradore Bay, July 21, 29 (WJB); Escuminac East, Gaspé, June 21, 29 (CPA).

**Tricyphona vernalis* (O.S.). Knowlton, July 4, 29 (GSW); Escuminac East Gaspé, June 21, 29 (CPA).

Amalopina flaveola (O.S.). Causapscal, June 18, 29 (GCC); Escuminac East, Gaspé, June 21, 29 (GCC).

Dicranota iowa Alex. Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Matapedia Valley, along mountain streams, June 18, 29 (GCC).

**Rhaphidolabis* (*Rhaphidolabis*) *cayuga* Alex. St. Honore, June 17, 29 (CPA); Matapedia Valley, June 18, 29 (CPA); Flatland, Gaspé, June 21, 29 (GCC).

**Rhaphidolabis* (*Rhaphidolabis*) *forceps* Alex. Knowlton, June 29, 29 (GSW).

Rhaphidolabis (*Rhaphidolabis*) *rogersiana* Alex. Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Causapscal, June 18, 29 (CPA); Matapedia Valley, along mountain streams, June 18, 29 (GCC).

**Rhaphidolabis* (*Rhapidolabis*) *rubescens* Alex. Escuminac East, Gaspé June 21, 29 (CPA).

**Rhaphidolabis* (*Rhaphidolabis*) *tenuipes* O.S. Bradore Bay, July 24, 29 (WJB).

Rhaphidolabis (*Plectromyia*) *confusa* Alex. Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Causapscal, June 18, 29 (CPA); Matapedia, June 18, 29 (GCC); Flatland, Gaspé, June 21, 29 (CPA); Escuminac East, Gaspé, June 21, 29 (CPA).

Hexatomini

**Adelphomyia minuta* Alex. Escuminac East, Gaspé, June 21, 29 (CPA).

**Ula elegans* O.S. Matapedia Valley, along mountain streams, June 18, 29 (GCC); Flatland, Gaspé, June 21, 29 (CPA).

Ula paupera O.S. Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Matapedia Valley, along mountain streams, June 18, 29 (GCC); Escuminac East, Gaspé, June 21, 29 (CPA).

Epiphragma fascipennis (Say). Penny's Brook, Knowlton, June 25, 29 (GSW); Mississquoi R., S. Bolton, July 5, 29 (GSW), a very small specimen; Riviere du Loup, June 17, 29 (CPA); Matapedia Valley, June 18, 29 (GCC); Escuminac East, Gaspé, June 21, 29 (GCC).

Dactylolabis montana O.S. Two miles north of Matapedia, on face of wet cliff, June 18, 29 (CPA).

Pseudolimnophila contempta (O.S.). Knowlton, July 9, 29 (GSW).

**Pseudolimnophila inornata* (O.S.). Bolton Pass Creek, Knowlton, June 26, 29 (GSW); New Richmond, Gaspé, June 19, 29 (CPA).

**Pseudolimnophila luteipennis* (O.S.). Shawbridge, Aug. 14, 29 (AFW).

**Pseudolimnophila noveboracensis* (Alex.). Knowlton, July 26, 29 (LJM).

Pseudolimnophila toxoneura (O.S). Flatland, Gaspé, June 22, 29 (CPA).

Limnophila (*Lasiomastix*) *macrocera* (Say). Shawbridge, Aug. 17, 29 (AFW); Knowlton, July 4-30, 29 (LJM and GSW).

Limnophila (*Phylidorea*) *adusta* O.S. Knowlton, July 10, 29 (GSW); Tabatiere, July 11, 29 (WJB), thorax darker than in normal individuals but agreeing in other regards; Escuminac East, Gaspé, June 21, 29 (GCC).

**Limnophila* (*Phylidorea*) *consimilis* Dietz, var. Knowlton, July 25, 29 (LJM).

**Limnophila* (*Phylidorea*) *luteola* Alex. Knowlton, July 24-25, 29 (LJM).

**Limnophila* (*Phylidorea*) *novae-angliae* Alex. Natashquan, Aug. 1, 29 (WJB).

**Limnophila* (*Phylidorea*) *platyphallus* Alex. Mt. Joli, June 17, 29 (GPA).

**Limnophila* (*Prionolabis*) *magdalena* Dietz. Amherst Is., Magdalen Is., July 15, 1917 (A. G. Huntsman). The identity of this species still remains in doubt. Its nearest ally seems to be *L.* (*P.*) *simplex* Alex.

Limnophila (*Prionolabis*) *munda* O.S. Natashquan R., Aug. 9, 29 (WJB)

Limnophila (*Prionolabis*) *rufibasis* O.S. Matapedia Valley, June 18, 29 (CPA); Escuminac East, Gaspé June 21, 29 (GCC).

**Limnophila* (*Dicranophragma*) *angustula* Alex. Knowlton, July 9, 29 (GSW).

Limnophila (*Dicranophragma*) *fuscovaria* O.S. Shawbridge, July 3, 29 (AFW); Escuminac East, Gaspé, June 21, 29 (CPA).

**Limnophila* (*Ephelia*) *sabrina* Alex. Knowlton, June 21, 29 (GSW); Flatlands, Gaspé, June 22, 29 (CPA).

**Limnophila* (*Ephelia*) *solstitialis* Alex. Knowlton, July 11, 29, (LJM).

Limnophila brevifurca O. S. Matapedia, June 18-22, 29 (CPA); Escuminac East, Gaspé, June 21, 29 (GCC).

**Limnophila subcostata* Alex. Escuminac East, Gaspé, June 21, 29 (CPA).

Limnophila unica O.S. Flatland, Gaspé, June 21, 29 (CPA); Crevasse on Mt. Ste. Anne, Perce, Gaspé, June 20, 29 (GCC).

Pilaria quadrata (O.S.). Sainte Angèle-de-Mérici, June 18, 29 (CPA); Escuminac East, Gaspé, June 21, 29 (CPA).

**Pilaria recondita* (O.S.). Knowlton Creek, June 23, 29 (GSW).

Pilaria tenuipes (Say). Knowlton, June 23, 29 (GSW), July 25, 29 (LJM).

Shannonomyia lenta (O.S.). Matapedia, June 18, 29 (CPA), specimen with cell M_2 of both wings open; Flatland, June 22, 29 (CPA).

**Eriocera brachycera* O.S. Knowlton, July 12-31, 29 (JM, LJM, GSW).

**Eriocera cinerea* Alex. Knowlton, July 8, 29 (LJM).

* Eriocera gaspensis sp. n.

Size small (wing, female, 8 mm.); antennae short in both sexes; general coloration gray, the praescutum with three dark brown stripes; knobs of halteres pale; wings pale brownish, the veins narrowly seamed with darker; *Rs* long, weakly angulated and spurred at origin; veins R_3 and R_4 gradually diverging; cell M_1 lacking; *m-cu* a little longer than distal section of Cu_1; ovipositor with fleshy valves.

Male.—Length, about 5-6 mm.; wing, 6-7.2 mm.

Female.—Length, about 7 mm.; wing, 8 mm.

Rostrum and palpi black, the former slightly pruinose. Antennae short in both sexes, the basal segment pruinose, 7-segmented in male, 8-segmented in female; in male, first flagellar segment subequal to or a little shorter than the succeeding two segments combined; remaining segments gradually decreasing in size, the last segment less than one-half the penultimate; in female, the terminal three segments short, subequal in length. Head dark gray; vertical tubercle relatively large and conspicuous.

Mesonotum gray, variegated with dark brown, the praescutum with a very broad median and narrow lateral stripes, the latter crossing the suture onto the scutal lobes. Pleura black, heavily pruinose. Halteres dusky, the knobs light yellow. Legs with the coxae and trochanters black, pruinose; femora obscure yellow basally, the tips broadly blackened, this including more than the distal half on all legs. Wings pale brownish, the veins narrowly seamed with darker; stigma oval, darker brown; veins brownish black. Venation: *Rs* long, weakly angulated and spurred at origin; R_{2+3+4} long; R_2 subequal or longer than R_{2+3}; veins R_3 and R_4 gradually diverging; the cell relatively short; cell M_1 lacking; *m-cu* at or just beyond the fork of M, a little longer than the distal section of Cu_1.

Abdomen black, pruinose, including the hypopygium. Male hypopygium with the outer dististyle narrow, at midlength narrowed into a long slender gently curved spine. Ovipositor with fleshy valves, the sternal valves brownish yellow narrowly blackened at tips.

Habitat.—Quebec (Gaspé).

Holotype, male reared from pupae taken at the River Pabos, near Chandler, emerged June 24, 1929 (C. P. Alexander).

Allotopotype, female, emerged June 26, 1929.

Paratopotype, male, emerged June 24, 1929; *paratype*, male, Matapedia Valley, June 18, 1929 (C. P. Alexander).

Type in the writer's collection.

Eriocera gaspensis is undoubtedly closely allied to *E. longicornis* (Walker), differing most notably in the short antennae of both sexes.

**Eriocera longicornis* (Walk.). Matapedia, June 22, 29 (CPA); Flatland, Gaspé, June 21-22, 29 (CPA and GCC).

Eriocera spinosa (O.S.). Knowlton, July 18, 29 (LJM), Aug. 3, 29 (JM).

**Penthoptera albitarsis* O.S. Knowlton, July 4-12, 29 (GSW).

Elephantomyia westwoodi O.S. Foster, July 31, 29 (GSW); Knowlton, July 12, 29 (GSW); W. Bolton R., Knowlton, June 26, 29 (GSW); Flatland, Gaspé, June 22, 29 (CPA).

Eriopterini

**Cladura flavoferruginea* O.S. (*indivisa* form). Shawbridge, Aug. 17-20, 29 (AFW); Sept. 12, 29 (E. McCarvell).

Gnophomyia tristissima O.S. Knowlton, July 12, 29 (GSW).

Gonomyia (*Gonomyia*) *noveboracensis* Alex. West branch of the Pabos R., Gaspé, a small swarm, June 19, 29 (CPA).

Gonomyia (*Gonomyia*) *subcinerea* (O.S.) Knowlton, June 20, 29 (GSW); Notre Dame du lac, Temiscouata, June 17, 29 (CPA); New Richmond, Gaspé, June 19, 29 (CPA); St. Charles-de-Caplan, Gaspé, June 19, 29 (CPA); Escuminac East, Gaspé, June 21, 29 (CPA).

**Toxorhina muliebris* O.S. Knowlton, June 24, 29 (LJM).

Helobia hybrida Meig. Knowlton, July 18, 29 (LJM), Aug. 2, 29 (LJM); Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Riviere du Loup, at Chute, June 17, 29 (GCC); Mt. Joli, June 17, 29 (CPA); Ste. Angèle-de-Mérici, June 18, 29 (CPA); New Richmond, Gaspé, June 19, 29 (CPA); Percé, Gaspè, June 20, 29 (CPA); Crevasse on Mt. Ste. Anne, June 20, 29 (GCC).

Cryptolabis paradoxa O.S. Mississquoi R., S. Bolton, Knowlton, July 5-13, 29 (GSW).

* **Psiloconopa cramptonella** sp. n.

General coloration polished black, the abdominal segments ringed with yellow; halteres light yellow; legs black; wings strongly tinged with dusky; cell 1*st* M_2 small.

Male.—Length, about 3.2-3.5 mm.; wing, 3.8-4.4 mm.

Female.—Length, about 4 mm.; wing, 4.5-4.6 mm.

Rostrum and palpi black. Antennae black throughout, shorter in the female; flagellar segments short-oval. Head broad, black, sparsely pruinose, especially in front.

Mesonotum chiefly polished black, the anterior lateral pretergites and posterior margin of the scutellum restrictedly obscure yellow; dorso-pleural region more sulphur-yellow. Pleura dull grayish black. Halteres light yellow. Legs black. Wings with a strong dusky tinge, the base and costal region a trifle more yellowish; stigmal region barely darker; veins dark brown. Venation: Sc_1 ending just before R_2, Sc_2 a short distance beyond origin of *Rs*, Sc_1 thus very long; *Rs* long and nearly straight; cell 1*st* M_2 small; *m-cu* at or just

before the fork of *M*; vein *2nd A* nearly straight. In some specimens, cell *1st* M_2 is very small to subatrophied.

Abdomen black, the caudal and lateral margins of the segments light sulphur-yellow, somewhat wider on the sternites; hypopygium orange. Male hypopygium with the dististyles of nearly equal length, the latter weakly emarginate at apex, the surface with abundant microscopic spiculae. Inner dististyle smooth, a little dilated at apex. Gonapophyses appearing as broad flattened plates, the tips truncate, the outer margin corrugated into spinous ridges. Aedeagus bifid. Valves of ovipositor long chitinized.

Habitat.—Quebec (Gaspé).

Holotype, male, River Pabos, near Chandler, June 20, 1929 (C. P. Alexander).

Allotopotype, female.

Paratopotypes, 15 of both sexes, 8 being in alcohol, June 19-20, 1929 (Alexander and Crampton.)

Type in the writer's collection.

This very distinct species is named in honor of my friend, Dr. G. Chester Crampton. *Psiloconopa cramptonella* is most similar to *P. meigenii* Zett. (Europe) and *P. verna* Alex. (Japan), the hypopygial characters being quite distinct. There is no close ally among the Nearctic species so far discovered.

**Ormosia arcuata,* (Doane). Aylmer, May 11, 29 (GSW); Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); New Richmond, Gaspé, June 19, 29 (CPA).

**Ormosia bilineata* Dietz. St. Honore, June 17, 29 (CPA); Causapscal, June 18, 29 (CPA); Matapedia Valley, June 18, 29 (CPA); Flatland, Gaspé, June 22, 29 (GCC); Percé, Gaspé, June 20, 29 (CPA).

Ormosia deviata Dietz. Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Ste. Angèle-de-Mérici, June 18, 29 (CPA); New Richmond, Gaspé, June 19, 29 (CPA).

Ormosia gaspensis Alex. Notre Dam du Lac, Temiscouata, June 17, 29 (CPA); Causapscal, June 18, 29 (CPA); St. Charles-de-Caplan, Gaspé, June 19, 29 (CPA); Percé, Gaspé, June 20, 29 (CPA); Flatland, Gaspé, June 21, 29 (GCC).

**Ormosia megacera* Alex. Flatland, Gaspé, June 21, 29 (CPA).

Ormosia meigenii (O.S.). Matapedia, June 18, 29 (CPA); St. Charles-de-Caplan, June 19, 29 (CPA); Escuminac East, Gaspé, June 21, 29 (GCC); Flatland, Gaspé, June 21-22, 29 (CPA).

Ormosia monticola (O.S.) Fairy Lake, Hull, Aug. 18, 29 (LJM).

Ormosia notmani Alex. Matapedia Valley, along mountain stream, June 18, 29 (GCC); New Richmond, Gaspé, June 19, 29 (CPA).

Ormosia pygmaea Alex. (*Nigripila* of List 1, p. 250) Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); New Richmond, Gaspé, June 19, 29 (CPA); Escuminac East, Gaspé, June 21, 29 (GCC).

Erioptera (*Hoplolabis*) *armata* O.S. Ste. Angèle-de-Mérici, June 18, 29 (CPA); Causapscal, June 18, 29 (GCC); Matapedia Valley, June 18, 29 (CPA); New Richmond, Gaspé, June 19, 29 (CPA); St. Charles-de-Caplan, Gaspé, June 19, 29 (CPA).

Erioptera (*Ilisia*) *armillaris* O.S. Knowlton, July 12, 29 (GSW); Mississquoi R., Bolton, July 13, 29 (GSW).

Erioptera (*Ilisia*) *venusta* O.S. Knowlton, July 1, 29 (LJM).

Erioptera (*Erioptera*) *chlorophylla* O.S. Knowlton, July 25, 29 (LJM).

Erioptera (*Erioptera*) *chrysocoma* O.S. Knowlton, June 28-29, 29 (JM and and GSW).

Erioptera (*Erioptera*) *septemtrionis* O.S. Shawbridge, Aug. 1, 29 (AFW); Knowlton, July 25, 27 (LJM), June 20, 29 (LJM), July 4, 29 (GSW); Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Mt. Joli, June 17, 29 (CPA); Percé, Gaspé, June 20, 29 (GCC).

**Erioptera* (*Erioptera*) *straminea* O.S. Knowlton, June 25-July 29, 29 (LJM).

Erioptera (*Erioptera*) *vespertina* O.S. Knowlton, June 20-29, 29 (GSW).

Erioptera (*Mesocyphona*) *caloptera* Say Knowlton, July 24-25, 29 (LJM); Sweetsburg, July 10, 29 (GSW).

Erioptera (*Mesocyphona*) *needhami* Alex. Knowlton, July 16-25, 29 (LJM).

**Erioptera* (*Empeda*) *stigmatica* (O.S.). Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Ste. Angèle-de-Mérici, June 18, 29 (CPA); L. Matapedia, June 18, 29 (GCC); Causapscal, June 18, 29 (CPA); New Richmond, Gaspé, June 19, 29 (CPA); Flatland, Gaspé, June 22, 29 (CPA).

**Molophilus forcipulus* (O.S.) Knowlton, June 20-23, 29 (GSW).

**Molophilus fultonensis* Alex. Shawbridge, July 4, 29 (AFW); Knowlton, June 29- July 25, 29 (LJM and GSW).

**Molophilus hirtipennis* (O.S.). Anse-au-Gascon, Gaspé, in a *Rhodora* bog, with much *Ledum,* balsam, spruce and larch, June 21, 29 (CPA).

* **Molophilus pollex** sp. n.

Belongs to the *gracilis* group, *pubipennis* subgroup; allied to *laricicola* Alex.; antennae (male) approximately one-half the length of body; wings yellowish gray, the axillary region more infumed; vein *2nd A* ending some distance before *m-cu;* male hypopygium with the outer lobe of the basistyle produced into a thumb-like structure; both dististyles with the concave lower margin more or less spinulose; aedeagus relatively short and stout.

Male.—Length, about 3.8 mm.; wing, 3.5 mm.; antenna about 1.8 mm.

Rostrum and palpi dark brown. Antennae black throughout, in male about one-half the length of the entire body; fourth flagellar segment a little longer than the third; outer flagellar segments very gradually decreasing in length. Head dark gray, the anterior vertex and occipital region brightened.

Anterior lateral pretergites whitish. Mesonotal praescutum light brown, the humeral region more yellowish; median region of scutum more grayish. Pleura yellowish brown. Halteres yellowish, the knobs infuscated. Legs with the coxae and trochanters obscure yellow; only the posterior legs remain, these unusually long and stout; femora obscure yellow, the tips narrowly infuscated; tibiae obscure yellow, the tips narrowly infuscated; tarsi dark brown. Wings yellowish gray, the prearcular and costal regions clearer yellow; axillary region in cell *2nd A* infumed; veins brownish yellow; macrotrichia dark brown. Venation: R_{2+3} nearly perpendicular at origin, in approximate alignment with R_2;

petiole of cell M_3 short, less than twice *m-cu*; vein *2nd A* short, ending some distance before *m-cu*.

Abdomen brown, the large hypopygium obscure yellow. Male hypopygium with the outer lobe of the basistyle developed into a long thumb-like lobe that is about as long as the longest dististyle; inner or ventro-lateral lobe with the spines generally short. Both dististyles with denticles or serrations along the lower or concave margin. Outer dististyle relatively slender, narrowed into a long apical point. Inner dististyle smaller, the outer face with more appressed serrations. Aedeagus relatively short and stout.

Habitat.—Eastern Canada.

Holotype, male, Notre Dame du Lac, Temiscouata, Quebec, June 17, 1929 (C. P. Alexander).

Paratype, male, Bristol, New Brunswick, June 16, 1929 (C. P. Alexander).

Type in the writer's collection.

Both specimens were swept from rank vegetation growing along small rocky streams. The antennae are of about the same actual length as in *M. laricicola* Alex. but appear longer because of the smaller size of the fly.

**Molophilus pubipennis* (O.S.). Knowlton, July 23, 29 (LJM).

**Molophilus quadrispinosus* Alex. Notre Dame du Lac, Temiscouata, June 17, 29 (CPA); Flatland, Gaspé, June 22, 29 (CPA).

MOSQUITO CONTROL IN EASTERN UNITED STATES

BY ARTHUR GIBSON,
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For several years, I have had the pleasure of attending the annual meetings of the New Jersey Mosquito Extermination Association. These meetings are held at Atlantic City, usually about the middle of February. This year the 18th annual meeting was held on February 18, 19 and 20. One would think from the name of the organization that problems discussed at these annual meetings are concerned with mosquito control within the state of New Jersey. While, in the main, this may be true, at the same time, non-residents of the state, have during recent years been taking a keen interest in the sessions, not only attending them personally but contributing valuable papers to the programmes. At the meeting held last February, entomologists and public health officers from Canada and the States of Connecticut, Massachusetts, New York, Illinois, etc., took an active part in the proceedings.

At the opening session on Wednesday evening, February 18, Dr. T. J. Headlee, State Entomologist of New Jersey, presented a valuable paper on "The Biology of the Important Economic Species of Mosquitoes Occurring in New Jersey"; Mr. F. W. Millar, Associate Entomologist of the New Jersey Experiment Station, one on "A Summary of Mosquito Control Accomplishments in New Jersey During 1930", and one by the writer, prepared by Mr. C. R. Twinn, Dominion Entomological Branch, on "The Biology of the Important Species of Mosquitoes Occurring in Eastern Canada." Dr. L. O. Howard, United States Bureau of Entomology, who for a number of years pre-

sented each year, a paper on "Mosquito Work Throughout the World", also spoke.

At the second and third sessions on February 19 and 20, other valuable papers were presented by superintendents of County Mosquito Commissions, public health officers, entomologists and others. Two papers by women prominent in mosquito work were presented by Mrs. H. N. Prickett, Chairman, Mosquito Control Committee, New Jersey State Federation of Women's Clubs, and Mrs. J. LeClere Shedakar, Chairman, Mosquito Control Committee of Burlington City and Township. Space will not permit us to comment on any of these contributions. For this report the writer has contributed an article on "Mosquito Suppression Work in Canada in 1930." A full report on the proceedings will soon be published by the Association and will be available to those specially interested.

The annual appropriations for mosquito control work in New Jersey now reach the remarkable sum of $539,500. In addition over $400,000 is appropriated in New York, Connecticut and Massachusetts. A total of close to one million dollars is thus spent in these states—truly a wonderful development.

A NEW SPECIES OF MYOCHROUS (CHRYSOMELIDAE, COLEOP.)

BY PAUL H. JOHNSON,
Brookings, S. Dak.

Myochrous movallus n. sp

Elongate, dull brown, covered densely with cinereous and brown scales. Anntennae brown at base, last five joints darker and broader. Thorax as long as broad, arcuate and dentate at sides; covered densely with scales, cinereous at sides, cinereous and brown on disk. Elytra twice as long as broad, punctures moderately large and closely placed, more confused at apex; vestiture at sides with a mixture of cinereous and brown on disk, one dense cinereous spot in front of umbone. Under surface dark brown, prosternal episterna and postocular lobe densely covered with cinereous scales, prosternum between the coxae with sparse white pubescence; mesosternum only sparsly scaled; sides of metasternum and metasteral epistrna moderately scaly; last segment of abdomen glabrous on basal half, the rest of the segments with small punctures and scales much less closely placed than on elytra, but with their arrangement very regular. Femora and tarsi reddish-brown, tibiae red, all covered with cinereous scales, those on tibiae in rows. First three joints of tarsi pubescent beneath, the third densely. Length 5 mm., width 2 mm.

Types—Five specimens taken at Elk Point, South Dakota, on June 24, 1926, by Geo. I. Gilbertson of the Entomology-Zoology Department of South Dakota State College.

This species resembles *M. magnus*, but is readily distinguished by the smaller size and by the antennae being darker at tips.

MAILED MONDAY, JUNE 22ND., 1931.